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Writing about Computer Science for kids

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Aim

- Improve your skills in writing in an engaging, accessible way
- As a result of the session you should:
  - write a CS4FN magazine/blog article to enthuse a 14-16 year old about some aspect of computer science / research
- I will publish any that are good enough (possibly after I've edited them) on the blog
- Browse https://cs4fn.blog

Think of a topic to write about

- There are lots of different topics you could write about
  - Your own project work / research (can be harder!)
  - A seminal paper
  - A topic that inspired you
  - A paper that inspired you
  - A newspaper article that inspired you to build on
  - A researcher (and their work) that inspired you
  - A person from some diverse background
    - gender, ethnic, religious, LGBTQ+, country, …
  - Social issues in computer science (eg bias)
  - An interesting interdisciplinary link to computer science

Do I really need to learn to write?

- Writing is a skill
  - You get better the more you practice
  - You need to practice different styles
  - Most people think they can write, but few are great at it.
- Writing is a key part of a researcher's /software engineer's job, but …
  - Most write in inaccessible ways
- Writing for kids can improve your writing (+ your research)
  - Writing about research for kids is an incredibly good way to improve your writing skills
  - It will also improve your ability to get jobs, projects, papers and grant proposals accepted too

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Activity 1

- This is a talk where you do stuff too
  - We are going to use a joint doc
  - https://bit.ly/writeCS4FN
- Open the document and add your name and initials

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Public Engagement with research

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Public Engagement is vital

- Educated society able to engage in informed debate
- Transformational change via public understanding/ pressure
- Improved writing and presentation skills
- Opportunities for dialogue, improve what you do
- Setting up the pipeline leading to future computer scientists
  - you will want good staff / PhD students too!
  - so inspire them as school kids
- RCUK/EPSRC thinks it so important it is an expected major component of grants

In good company

- Public Engagement has a long history here
  - The Royal Institution's Christmas Lectures for children were set up by **Faraday**
    - 200 years ago.
  - He personally gave the lectures in 19 years
- UK are still world leaders in recognising the importance of public engagement
- QMUL is a world leader
  - 1st institution to gain a Platinum PE award

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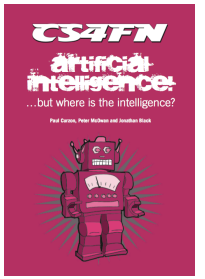
CS4FN: inspiring kids

- A FREE magazine + blog + shows for 18 years
- Global readership
- >2000 UK schools take copies including class sets
- Years of highly positive feedback:
  - “This magazine… It's simply awesome.”
  - “This has to be THE most inspired bit of literature/ content for getting youngsters switched onto Computer Science”



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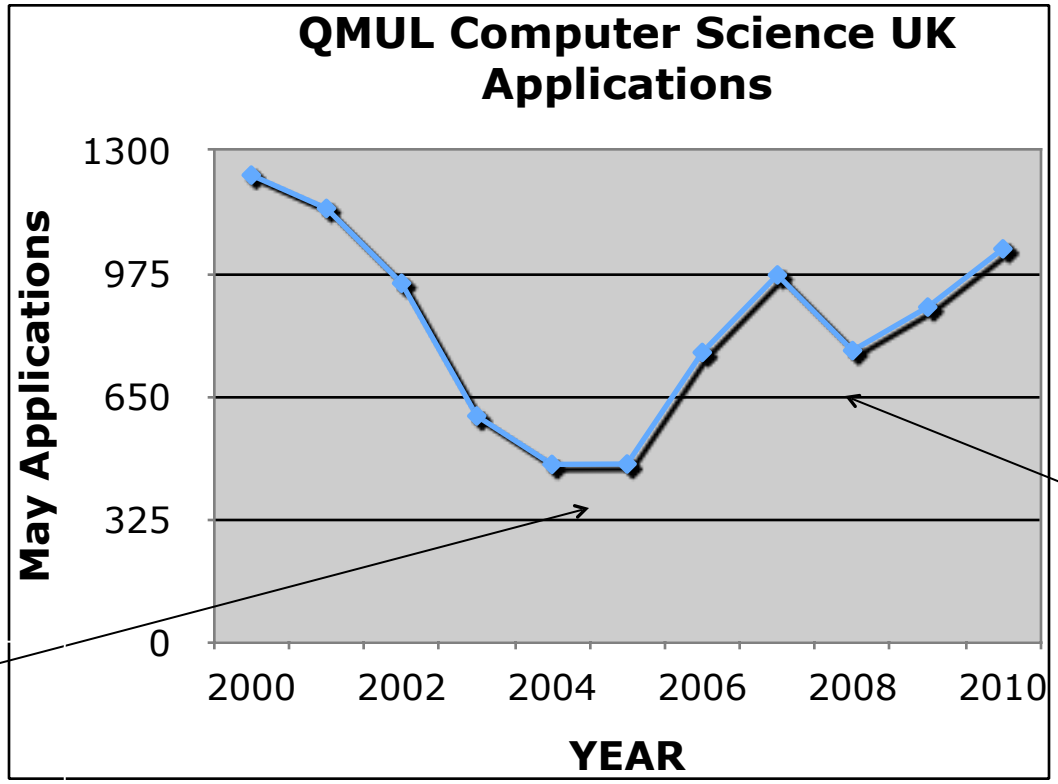
…and it does kick-start the pipeline



Start CS4FN

5 not 6 university choices

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How to write for kids

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Write for an audience

- Important to write for the audience
- Different outlets need different styles
  - Research paper
  - Trade article
  - Press release
  - Newsletter
  - Magazine article
  - Documentation
  - Final Report
  - Project web page
  - Proposal
  - Wikipedia page
- Some are more formal than others
- **ALL are improved by clear, accessible writing**

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Activity 2

Write (in the shared doc) up to 3 thoughts on:

- What are the important properties of an article for school students (age 14-16)?
- Think about how the language, style and content differ from a research paper

Writing for kids: my personal thoughts

- Do NOT do it by writing “for” kids!
  - Do write in an accessible way,
  - Do not patronise or talk down …Treat as adults
- Write in plain English
  - Jargon free (except jargon being explained)
  - Avoid acronyms
  - Short punchy sentences
  - Replace long words by short ones
- Chatty, informal style not formal writing
  - Active not passive voice (actions done to subject)
    - “Ada Lovelace **found** the first bug.” NOT
    - “The first bug **was found by** Ada Lovelace.”

Writing for kids: my personal thoughts

- Simplify the issues
  - Focus on ONE main point
  - It is ok to give a simplified version of the reality
    - (eg “atoms are like a solar system…”)
- Include “a sense of fun”… get across your excitement
- Use metaphors and surprising everyday links
  - Not just illustrative examples
  - Eg “IDF weighting is a talent show judge for web pages”
  - Use popular culture: films, books, games
  - but make sure the link deeply illustrates the points
- Write what the audience wants to read not what you want to write
  - eg They aren’t interested in a long list of names of a paper’s authors (even though you are)

Different purposes

- What about writing a summary for a public research / development project website?
  - It may be read by researchers, clinicians, patients, procurement people, manufacturers, teachers, school children, interested general public,..
  - How is this going to differ?
- What issues are going to be the same?

How does it differ? A personal view

- Still need single core message
- Still need the same simple accessible language
- Need to be more direct, more serious, less fun, only serious metaphors (not wacky links)
- Core may be similar but the start-ending completely different
- May be completely different
  - It wouldn't be an article about a talent show for words!
- Titles definitely different, but still not research paper titles

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Writing accessibly is a hard skill…

- For researchers / professionals writing for the public is even more difficult than for journalists
  - We have to avoid being sensational
  - We have to avoid alienating stakeholders
  - We have to respect those involved (eg patients in healthcare research)

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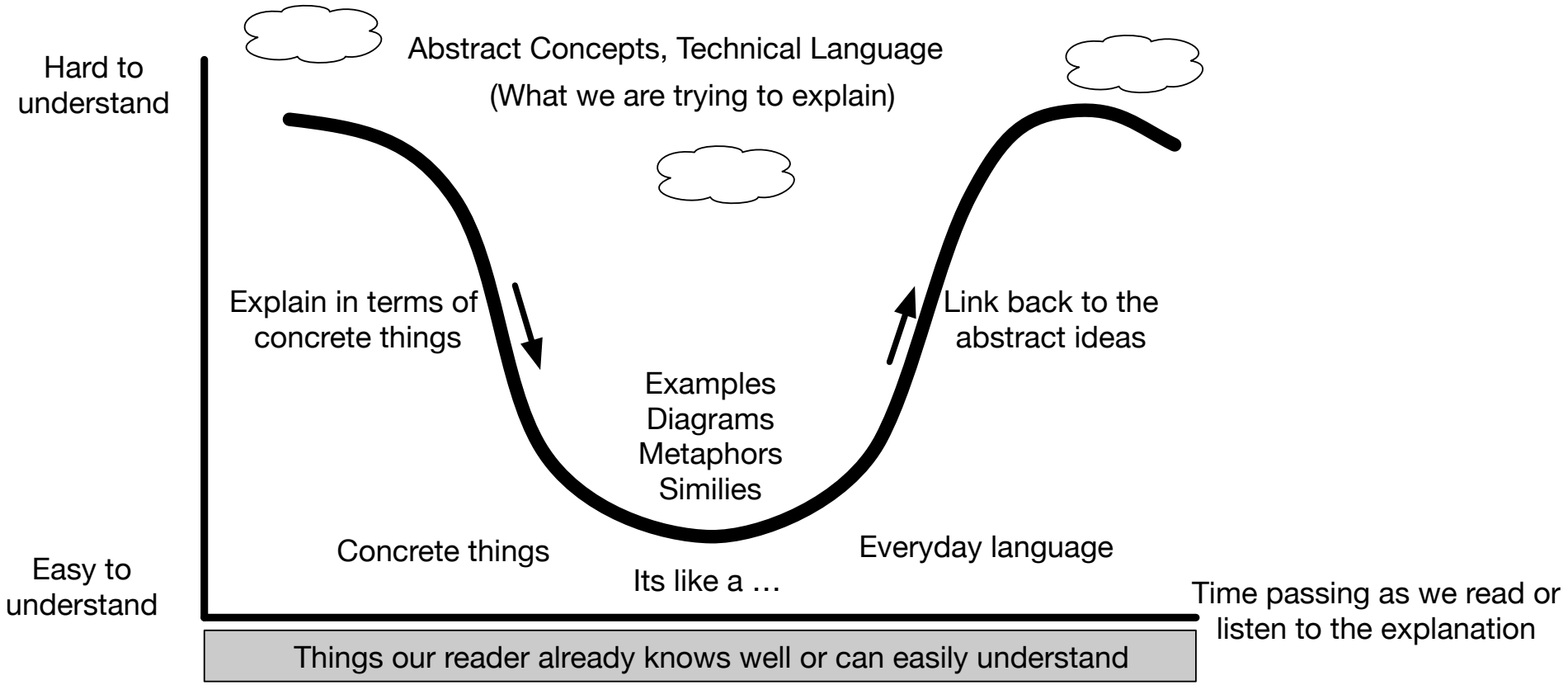
A good explanation follows a wave pattern

Adapted from Maton, 2013



What matters in the wave

- Wave could be either u or n shaped
- Both unpacking and repacking are important.
  - but especially important to repack
  - ie make links upwards.
- Really good writing has waves within waves and waves following waves

What to write?

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Activity 3: What is your topic You are writing for kids

- There are lots of different topics you could write about
  - Your own project / research (can be hard!)
  - A seminal paper
  - A topic that inspired you
  - A paper that inspired you
  - A newspaper article that inspired you to build on
  - A researcher (and their work) that inspired you
  - A person from some diverse background
    - gender, ethnic, religious, LGBTQ+, country, …
  - Bias or other social issues in computer science research
  - Interesting interdisciplinary links …
- Add them to the shared doc

Core Messages

- Don’t try and cover everything there is to say
- Have a single, short, core message you aim to communicate
  - plus at most 3 sub-messages
- It should be short, simple and interesting
- Pick a single concept
  - aim to teach it (by subterfuge)
- Examples of core messages
  - “ When nurses make mistakes, don’t blame the nurse, fix the system”
  - “A woman invented the key algorithm behind search engines”

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Activity 3 (continued) What are your core messages?

- Write down up to 3 ideas for core messages you might like to communicate in your article
  - Add them to the shared doc with your topic
  - Read those of other people
  - Can you improve them (including yours)?
  - Add constructive comments, other ideas
- Reflect - Can you improve yours?
- Which is strongest: pick one to write.
  - You may change it as you write but know what it is

What to write

- Tell a story
    - eg a twist at the end, be biographical, …
- Aim to inspire
  – If it doesn't excite you it won't excite them
- Perhaps include a basic CS concept to explain
    - eg what logic gates are,
- Avoid most technical terms
    - If you do use a technical term, explain it
    - use as an opportunity to teach concept
- Make sure the argument flows

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Activity 4
Begin to write your article

- You have 5 minutes to start a first draft 100 or so words on your message (for kids)
- Don’t worry about it being brilliant
  - just get something down at this stage

- Full CS4FN articles are 400-900 words

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Begin to write your article

- Post your draft in the Google doc, Read those of others …
- Come up with positive suggestions to improve them and add comments
    - Are parts too technical?
    - Do the metaphors used help or hinder?
    - Does the argument flow?
    - Are sentences long and rambling?
    - Could the words be shorter or simpler?
    - Does any jargon need to be explained (or perhaps better removed) …
- Rewrite yours based on the comments!

Read it! Rewrite …again and again

- DO NOT just write then submit.
- Read and re-read, EDIT and reedit the sentences of your article
  - OVER AND OVER AGAIN
- Craft them until they sound really good.
- Make sure they flow from one to the next in a coherent way.

- Proof read carefully at a sentence level
- Then proof read for overall meaning and flow

Starts and Ends

Activity 5:
What is the best start? Why?

1: A:

Probability and statistics are playing an increasingly important role in legal cases. But, because lawyers and even expert witnesses are not trained in this kind of maths or computer science, they often make serious mistakes when presenting such evidence in court.

OR

1: B:

The prosecution gives a jury misleading information about a computer system in court. An innocent person goes to prison.

Activity 5:
What is the best start? Why?

2. A:

Stadium concerts are only possible because of modern loudspeaker technology. Clever as we are, the Ancient Greeks were better. They solved the problem without technology. They just used the seats.

OR

2. B:

Modern technology has given us the ability to improve audibility with things like loudspeakers but there are also natural ways with which you can achieve similar results, even though this may come from exploiting complex acoustic physics.

The start

- It is important to have a strong start
- The first sentence (or so) should GRAB attention
- Some ideas of how to give a GRAB
  - Make a powerful statement linked to people's lives
  - Make a surprising link
  - Ask an intriguing question
  - Make an off-beat statement
  - State an important unsolved problem

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Activity 6
Write a good start …

- Write a strong first 2 lines for your article
- Read the starts written by others.
- After the talk look at some CS4FN starts on cs4fn.blog. Which work well, which don't (and why)?

- Good starts matter lots in grant applications!

Endings

- Have an ending, don't just stop
- Bring the start back in at the end eg
  - Answer the question originally set
  - Tie up the good thing that has been discussed
  - Reinforce the message
  - Make it personal to the reader

Activity 7:
Which is the best ending?

A:

Thanks to some 250 year-old maths and some very modern computer science, fewer innocent people could end up in jail. It matters! The innocent person in the dock could one day be you.

OR

B:

Although changes in legal practice happen very slowly, it is possible that there is sufficient momentum to ensure that, in future, the use of methods like this will be standard for evaluating all types of evidence at all stages in the criminal justice process.

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Activity 8
Work on your ending

- Work on your ending
- Come up with a strong last 2 lines for your article

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The Title

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Titles! Grab attention

- Titles should grab attention
- Make them short and punchy
- Think Tabloid headlines not research paper titles:
  - “Swat a way to drive”
  - “Even the dolphins use pocket switched networks!”
  - “Hacking Teapots”
  - “Can you trust a smile?”
  - “Looking inside medicine: computer scientists in your body”
  - “Ratatouille: Rats doing massively parallel computing”
  - “Claytronics: from goo to you”

Activity 9
The title

- Think of 3 possible titles for your article
- Compare notes, choose your favourite

Now re-read and rewrite (again and again)

Summary

- Anyone can write for kids if they are enthusiastic and willing to practice!
  - Focus on one core message
  - Treat readers as adults, but write accessibly
  - Make the start grab attention, tell the story, then tie it all back together in your ending

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Email me

- Work together to come up with articles
- If you want your article to be published on cs4fn.blog THEN
  - Email it to me p.curzon@qmul.ac.uk
- I'm happy to give feedback, edit it or help you edit it to turn it into a finished article in a suitable CS4FN style
- If you enjoy writing it then write more!